

WHAT IS CLAIMED IS

1 1. A mesh dividing device for performing a mesh dividing  
2 process of an analytical target model provided as  
3 three-dimensional CAD data into cuboids for  
4 numerical-analysis, comprising:

5 a library for previously storing two or more kinds  
6 of parameter kits each including a maximum number of  
7 cuboids which defines the upper limit of the number  
8 of said cuboids and parameters for division-control  
9 for dividing said analytical target model into said  
10 cuboids;

11 a selecting unit for selecting at least one of said  
12 two or more kinds of parameter kits stored in said  
13 library; and

14 a mesh dividing unit for performing a mesh dividing  
15 process so as to divide said analytical target model,  
16 based on a parameter kit selected by said selecting  
17 unit (hereinafter referred to selected parameter kit)  
18 and said three-dimensional CAD data, into cuboids of  
19 less than or equal to the maximum number of cuboids  
20 included in said selected parameter kit.

1 2. The mesh dividing device according to claim 1,  
2 further comprising a display unit capable of displaying  
3 various kinds of information including the contents

4 of said two or more kinds of parameter kits stored in  
5 said library, said display unit displaying the contents  
6 of said selected parameter kit.

1 3. The mesh dividing device according to claim 2,  
2 further comprising a parameter kit designating unit  
3 by which the operator designates one of said two or  
4 more kinds of parameter kits stored in said library  
5 while referring to a display provided by said display  
6 unit, wherein said selecting unit selects a parameter  
7 kit designated by said parameter kit designating unit  
8 to be said selected parameter kit.

1 4. The mesh dividing device according to claim 3,  
2 further comprising a modification unit by which said  
3 operator modifies the contents of a parameter kit  
4 designated by said parameter kit designating unit while  
5 referring to a display provided by said display unit,  
6 wherein said selecting unit selects a parameter kit  
7 modified by said modification unit to be said selected  
8 parameter kit.

1 5. The mesh dividing device according to claim 4,  
2 further comprising a saving control unit for storing  
3 the contents of a parameter kit modified by said  
4 modification unit into said library according to an

5 instruction externally given by said operator.

1 6. The mesh dividing device according to claim 2,  
2 further comprising a reference component designating  
3 unit by which the operator designates a reference  
4 component from the components of said analytical target  
5 model while referring to a display provided by said  
6 display unit, wherein said mesh dividing unit handles  
7 said reference component designated by said reference  
8 component designating unit, and a component smaller  
9 than said reference component, as exception to target  
10 for said mesh dividing process.

1 7. The mesh dividing device according to claim 3,  
2 further comprising a reference component designating  
3 unit by which the operator designates a reference  
4 component from the components of said analytical target  
5 model while referring to a display provided by said  
6 display unit, wherein said mesh dividing unit handles  
7 said reference component designated by said reference  
8 component designating unit, and a component smaller  
9 than said reference component, as exception to target  
10 for said mesh dividing process.

1 8. The mesh dividing device according to claim 4,  
2 further comprising a reference component designating

3 unit by which the operator designates a reference  
4 component from the components of said analytical target  
5 model while referring to a display provided by said  
6 display unit, wherein said mesh dividing unit handles  
7 said reference component designated by said reference  
8 component designating unit, and a component smaller  
9 than said reference component, as exception to target  
10 for said mesh dividing process.

1 9. The mesh dividing device according to claim 5,  
2 further comprising a reference component designating  
3 unit by which the operator designates a reference  
4 component from the components of said analytical target  
5 model while referring to a display provided by said  
6 display unit, wherein said mesh dividing unit handles  
7 said reference component designated by said reference  
8 component designating unit, and a component smaller  
9 than said reference component, as exception to target  
10 for said mesh dividing process.

1 10. The mesh dividing device according to claim 6,  
2 wherein said mesh dividing unit handles a component  
3 of which at least one of the maximum outer dimensions  
4 in the three axial directions is less than or equal  
5 to the corresponding one of the maximum outer dimensions  
6 in the three axial directions of said reference

7 component, as exception to target for said mesh dividing  
8 process.

1 11. The mesh dividing device according to claim 7,  
2 wherein said mesh dividing unit handles a component  
3 of which at least one of the maximum outer dimensions  
4 in the three axial directions is less than or equal  
5 to the corresponding one of the maximum outer dimensions  
6 in the three axial directions of said reference  
7 component, as exception to target for said mesh dividing  
8 process.

1 12. The mesh dividing device according to claim 8,  
2 wherein said mesh dividing unit handles a component  
3 of which at least one of the maximum outer dimensions  
4 in the three axial directions is less than or equal  
5 to the corresponding one of the maximum outer dimensions  
6 in the three axial directions of said reference  
7 component, as exception to target for said mesh dividing  
8 process.

1 13. The mesh dividing device according to claim 9,  
2 wherein said mesh dividing unit handles a component  
3 of which at least one of the maximum outer dimensions  
4 in the three axial directions is less than or equal  
5 to the corresponding one of the maximum outer dimensions

6 in the three axial directions of said reference  
7 component, as exception to target for said mesh dividing  
8 process.

1 14. The mesh dividing device according to claim 2,  
2 wherein said selecting unit automatically selects said  
3 selected parameter kit based on said three-dimensional  
4 CAD data.

1 15. The mesh dividing device according to claim 14,  
2 wherein said selecting unit computes, based on said  
3 three-dimensional CAD data, shape-feature information  
4 and physical-property-feature information about said  
5 analytical target model or components of said  
6 analytical target model, and selects a parameter kit  
7 corresponding to the computed shape-feature  
8 information and physical-property-feature  
9 information, to be said selected parameter kit.

1 16. The mesh dividing device according to claim 15,  
2 wherein:  
3 said library previously classifies and stores said  
4 two or more kinds of parameter kits each being brought  
5 into correspondence with levels of shape-feature  
6 information and physical-property-feature  
7 information which are assumed for said analytical

8 target model; and  
9 said selecting unit selects a parameter kit  
10 corresponding to levels to which the computed  
11 shape-feature information and  
12 physical-property-feature information belong, to be  
13 said selected parameter kit.

1 17. The mesh dividing device according to claim 15,  
2 wherein said shape-feature information includes  
3 information about the scale of said analytical target  
4 model and implementation forms of components in said  
5 analytical target model.

1 18. The mesh dividing device according to claim 16,  
2 wherein said shape-feature information includes  
3 information about the scale of said analytical target  
4 model and implementation forms of components in said  
5 analytical target model.

1 19. The mesh dividing device according to claim 17,  
2 wherein said implementation form is information about  
3 volume distribution in said analytical target model.

1 20. The mesh dividing device according to claim 18,  
2 wherein said implementation form is information about  
3 volume distribution in said analytical target model.

1 21. The mesh dividing device according to claim 15,  
2 wherein said physical-property-feature information is  
3 information about thermal conductivity distribution  
4 in said analytical target model.

1 22. The mesh dividing device according to claim 2,  
2 further comprising a conversion time estimating unit  
3 for estimating, based on said selected parameter kit,  
4 a conversion time required for said mesh dividing unit  
5 to perform a mesh dividing process for said analytical  
6 target model, wherein said display unit displays said  
7 conversion time estimated by said conversion time  
8 estimating unit.

1 23. The mesh dividing device according to claim 22,  
2 wherein said conversion time estimating unit measures  
3 a time required for a simplified mesh dividing process  
4 for said analytical target model, the simplified mesh  
5 dividing process being performed on the basis of said  
6 selected parameter kit, and estimates said conversion  
7 time to be a value obtained by multiplying the measured  
8 time by a predetermined coefficient.

1 24. The mesh dividing device according to claim 1,  
2 wherein said parameters for division-control include  
3 the number of the mesh-division in the three axial



4 directions, tolerances in the three axial directions,  
5 and a volume conversion rate.

1 25. A computer-readable recording medium in which a  
2 mesh dividing program for instructing a computer to  
3 function as a mesh dividing device for performing a  
4 mesh dividing process to divide an analytical target  
5 model provided as three-dimensional CAD data into  
6 cuboids for numerical-analysis, wherein  
7 said mesh dividing program  
8 includes a library for previously storing two or  
9 more kinds of parameter kits each including a maximum  
10 number of cuboids which defines the upper limit of the  
11 number of said cuboids and parameters for  
12 division-control for dividing said analytical target  
13 model into said cuboids, and  
14 instructs said computer to function as  
15 a selecting unit for selecting at least one of said  
16 two or more kinds of parameter kits stored in said  
17 library, and  
18 a mesh dividing unit for performing a mesh dividing  
19 process so as to divide said analytical target model,  
20 based on a parameter kit selected by said selecting  
21 unit and said three-dimensional CAD data, into cuboids  
22 of less than or equal to the maximum number of cuboids  
23 included in said selected parameter kit.

1 26. A method for setting, when performing a mesh  
2 dividing process to divide an analytical target model  
3 provided as three-dimensional CAD data into said  
4 cuboids, a maximum number of cuboids which defines the  
5 upper limit of the number of cuboids for  
6 numerical-analysis, and parameters for  
7 division-control for dividing said analytical target  
8 model into said cuboids, comprising the steps of:  
9 previously storing two or more kinds of parameter  
10 kits, as a library, each including said maximum number  
11 of cuboids and said parameters for division-control;  
12 selecting at least one of said two or more kinds  
13 of parameter kits stored in said library, when  
14 performing a mesh dividing process for said analytical  
15 target model; and  
16 setting a maximum number of cuboids and a parameter  
17 for division-control included in the selected  
18 parameter kit, on a unit for performing said mesh  
19 dividing process.